thickness while least for the width.The maximum width is overestimated especially when the parametrial invasion is present at BT with CT based contouring.

OC-0276

Comparison of MRI, TRUS and CT for target definition in image-guided adaptive brachytherapy of cervical cancer

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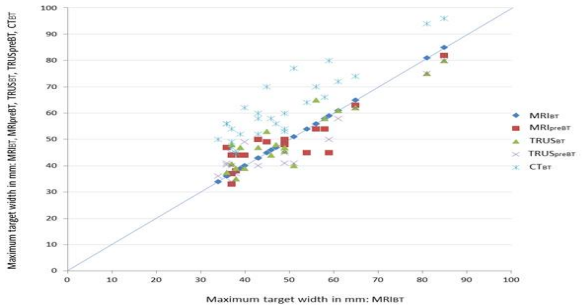
Purpose/Objective: To compare the maximum target dimensions and image quality between magnetic resonance imaging (MRI), transrectal ultrasound (TRUS) and computed tomography (CT) in image guided adaptive brachytherapy (IGABT) of locally advanced cervical cancer

Materials and Methods: All patients with locally advanced cervical cancer treated with radiochemotherapy and IGABT between 09/2012-05/2013 were included in this study. T2-weighted MRI (1.5 tesla), TRUS and CT were performed before (MRI_{preBT}, $TRUS_{preBT}$) and / or after (MRI_{BT}, $TRUS_{BT}$ and CT_{BT}) insertion of the applicator. 3D TRUS image acquisition was done with a customized US stepper device and software. The target was defined on 3D image sequences acquired with different imaging modalities by one blinded observer, in accordance to the GEC-ESTRO recommendations for MRI-based target volume delineation, as the complete cervical mass including the tumour, any suspicious areas of parametrial involvement and the normal cervical stroma. Maximum target width and thickness were measured on transversal planes. Image quality was classified using the following scoring system: Grade 0: not depicted, Grade 1: inability to discriminate, margin not recognizable, Grade 2: fair discrimination, margin indistinct, Grade 3: excellent discrimination, margin distinct. Descriptive statistics, mean differences between the groups, with MRI_{BT} as reference, and a paired t-test were calculated.

Results: Images from 21 patients (FIGO IB: 3, IIB: 11, IIIB: 5, IVB: 2) were available for analysis. The mean difference in maximum target width of $TRUS_{BT}$, $TRUS_{preBT}$, MRI_{preBT}, CT_{BT} to MRI_{BT} was 0.5mm ±5.5 (n.s.), -1.7mm ±5.7 (n.s.), 0.0mm ±5.7 (n.s.) and 12.9mm ±6.1 ($p < 0.001$) (figure 1). The mean difference in maximum target thickness of $TRUS_{BT}$, $TRUS_{preBT}$, MRI_{preBT}, CT_{BT} to MRI_{BT} was -3.5mm ±5.5 ($p=0.012$), -7.6mm ±4.3 ($p <0.001$), 0.5mm ±6.4 (n.s.) and 11.8mm ±6.3 ($p < 0.001$). Mean scores of image quality of the target volume was 2.9 for $TRUS_{preBT}$, 2.3 for $TRUS_{BT}$, 2.9 for MRI_{preBT}, 2.7 for MRI_{BT} and 2.1 for CT_{BT}.

Figure 1



Conclusions: TRUS seems to be superior to CT for assessment of the target volume in IGABT of cervical cancer as it yields systematically smaller deviations from the gold standard T2-weighted MRI, with reasonable image quality. Differences of TRUS target thickness might likely be related to differences in image slice orientation and compression of the target volume by the TRUS probe before insertion of the brachytherapy applicator.

OC-0277

Brachytherapy improves survival for inoperable stage I endometrial adenocarcinoma: a population-based analysis

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Purpose/Objective: To assess the use of brachytherapy with or without external beam radiation in medically inoperable stage I endometrial adenocarcinoma in the United States and to determine the effect of brachytherapy on overall survival (OS) and cause specific survival (CSS).

Materials and Methods: Data between 1998 and 2011 from the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) database were analyzed. Coarsened exact matching was used to adjust for differences in age, grade and year of diagnosis between patients who received brachytherapy and those who did not. Prognostic factors affecting OS and CSS including age, grade, race, marital status, metropolitan residential area, and year of diagnosis were evaluated using Kaplan Meier product-limit method and Cox proportional hazards regression model. Cumulative incidence was calculated using a competing risks model.

Results: A total of 460 patients with inoperable stage I endometrial adenocarcinoma treated with radiation therapy were identified. Radiation consisted of either external beam radiation (n=260) or brachytherapy with or without external beam radiation (n=200). The only factor associated with brachytherapy use was younger patient age (median age: 72 vs. 76, $p=0.001$). Median survival for all patients was 40 months. Patients who received brachytherapy had a higher 3 year OS (OS: 60% vs. 47%, $p<0.001$) and CSS (CSS: 82% vs. 74%, $p=0.032$) compared to those who did not. On multivariate analysis, brachytherapy use was independently associated with an improved OS (OS: hazard ratio [HR]=0.68, 95% confidence interval [CI]: 0.52 – 0.87) and CSS (CSS: HR=0.61, 95% CI: 0.39 – 0.93). In the matched cohort of patients (n=260), the OS benefit associated with brachytherapy remained significant on multivariate analysis (OS: HR=0.65, 95% CI: 0.47 - 0.88). Brachytherapy was also associated with a lower 2 year cumulative incidence of cancer specific death (19% vs. 13%).

Conclusions: Brachytherapy is independently associated with an improved OS. It should be considered as part of the treatment regimen for all stage I inoperable endometrial patients undergoing radiation.

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No bridge too far

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